

Using HYCOM for a Coupled Bio-Physical Model for the US West Coast

John Kindle

Sergio deRada, Igor Shulman, Brad Penta

Coupled Processes Section

Oceanography Division

Naval Research Laboratory

Josefina Olascoaga

RSMAS

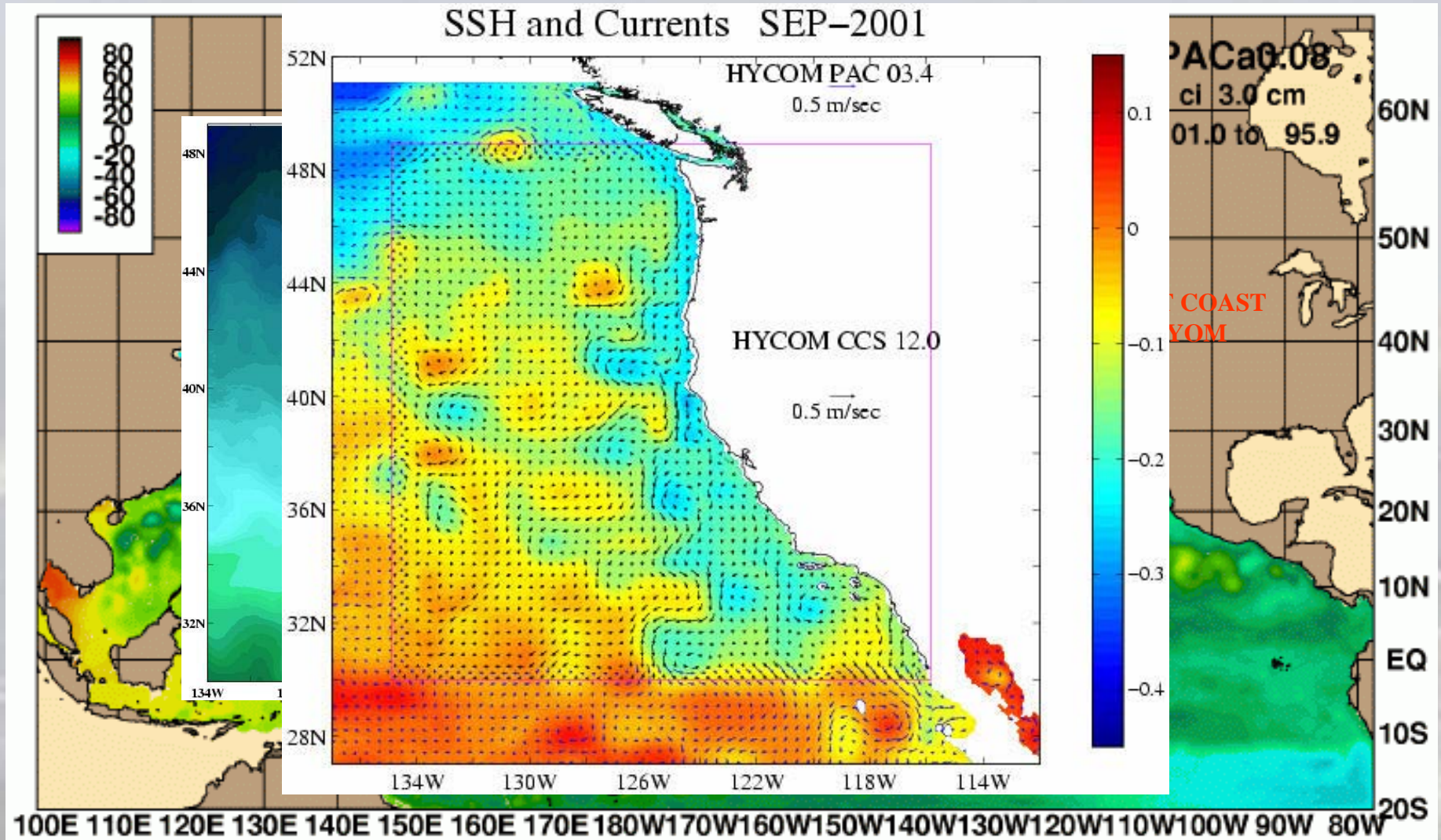
Report Documentation Page				Form Approved OMB No. 0704-0188	
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.					
1. REPORT DATE DEC 2005		2. REPORT TYPE		3. DATES COVERED 00-00-2005 to 00-00-2005	
4. TITLE AND SUBTITLE Using HYCOM for a Coupled Bio-Physical Model for the US West Coast				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Naval Research Laboratory, Oceanography Division, Stennis Space Center, MS, 39529				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited					
13. SUPPLEMENTARY NOTES 9th HYCOM Consortium Meeting, Dec 6-8, 2005, RSMAS, Miami, FL					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT Same as Report (SAR)	18. NUMBER OF PAGES 12	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			

HYCOM West Coast Modeling

- Utilize Boundary values from Pacific Basin HYCOM Run (Metzger)
- Focus on period 1999-2002 +
 - Parallels NRL effort with NCOM
 - Uses High Resolution COAMPS Reanalysis Forcing
 - NRL Monterey/ Air-Sea Coupling project
- Leverage results from
 - NRL CoNESTS: West Coast HYCOM
 - PARADIGM NOPP: Ecosystem Model
 - NRL CoBIOPP: NCOM coupled physical-bio-optical
 - NRL Coupled Air-Sea in Coastal Zone: COAMPS
 - Collaborations(HYCOM modeling, Field Programs,++)

1/12° Pacific HYCOM Basin-scale Circulation

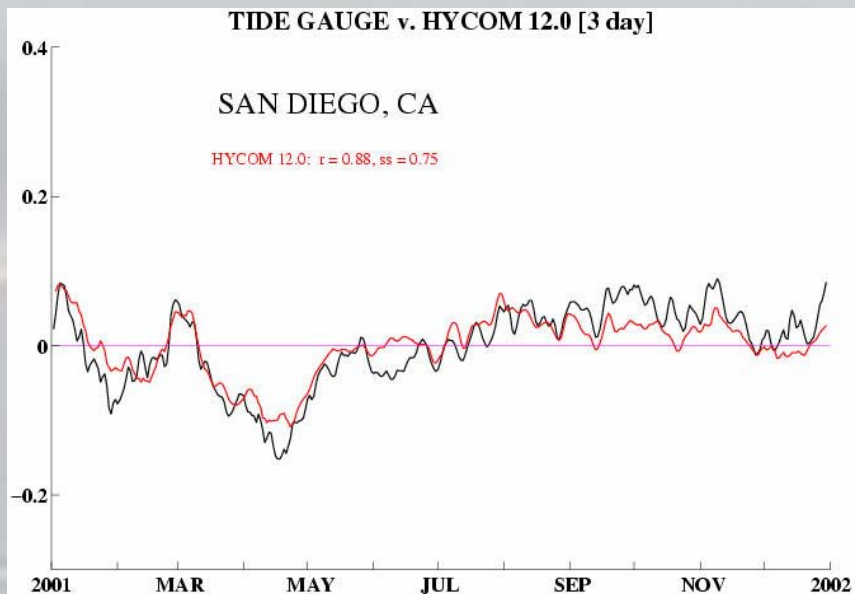
SSH Snapshot



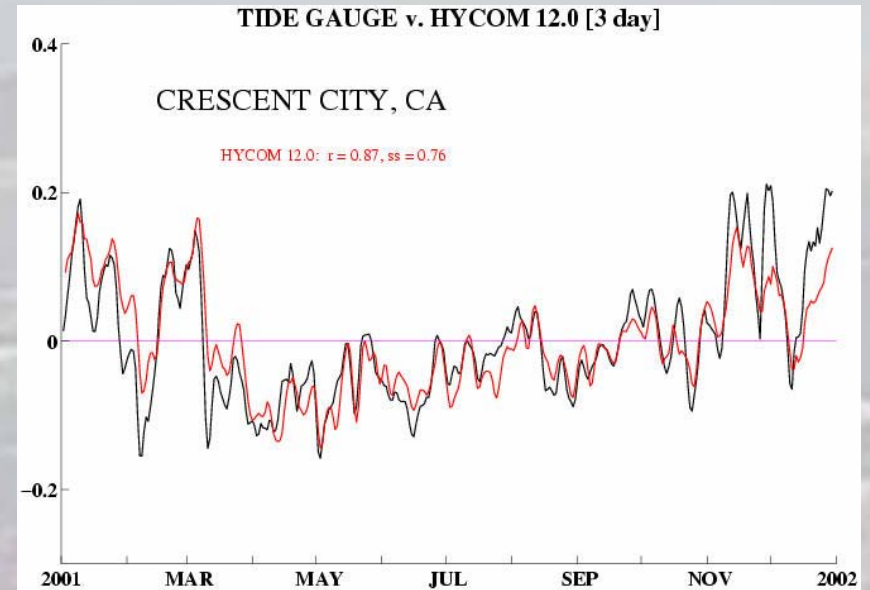
Forced with high frequency climatological ECMWF winds and thermal forcing

HYCOM-CCS: Coastal Sea level

San Diego

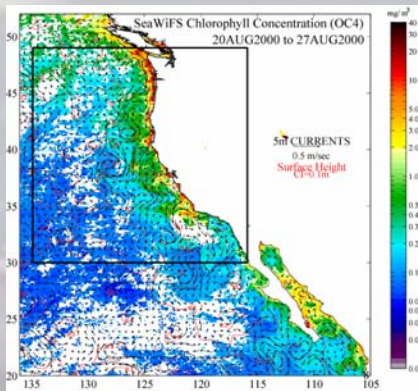


Crescent City

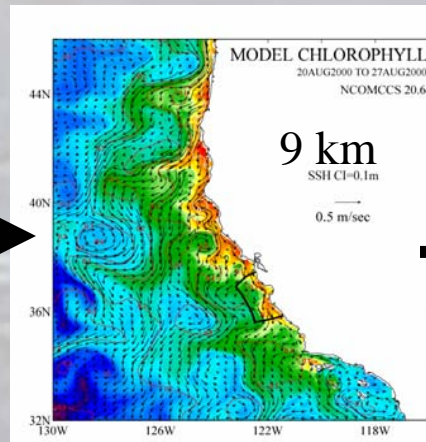


Modeling Approach

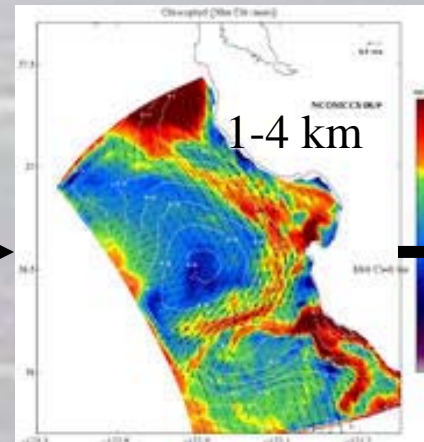
- Utilize NCOM/ HYCOM
 - Couple Across scales
 - Global: Regional: Coastal: Local
 - Embedded Ecosystem Model: COSINE
 - Force with High Resolution COAMPS Fluxes: 81/27/9/3 km grid
 - Run in near real-time



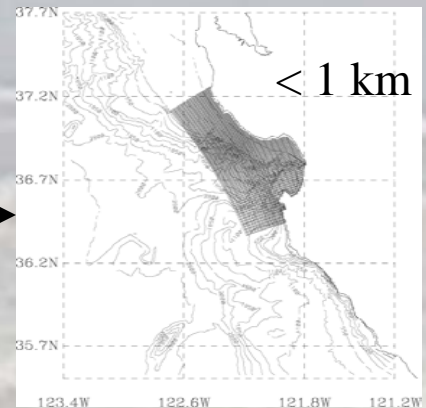
GLOBAL NCOM
GLOBAL HYCOM



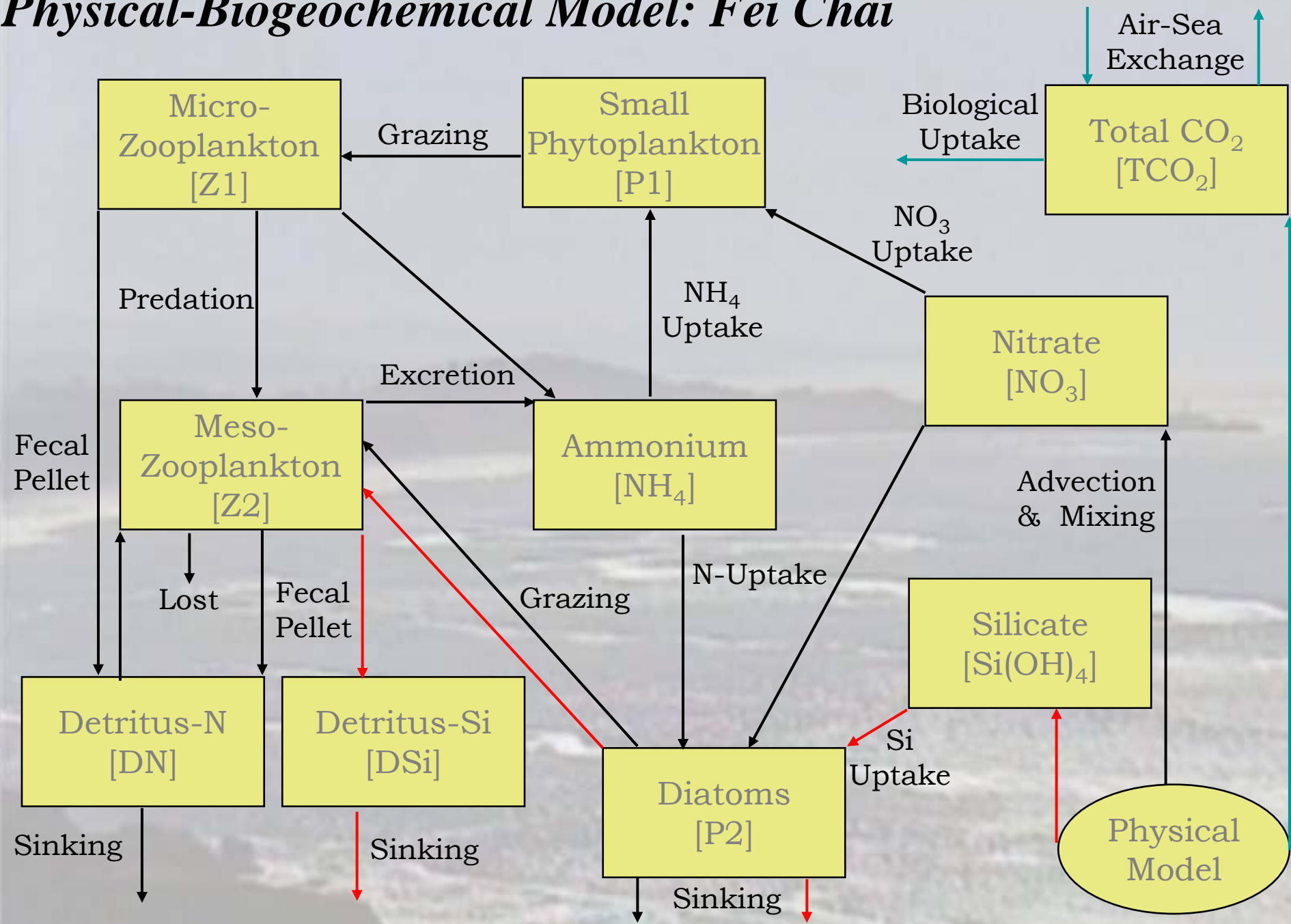
REGIONAL NCOM CCS
REGIONAL HYCOM CCS



MONTEREY BAY
ICON Domain



Physical-Biogeochemical Model: Fei Chai



COAMPS Surface Fluxes for US West Coast

COAMPS Reanalysis

COAMPS—AOSN



Development Issues for HYCOM Coupled Bio-Physical

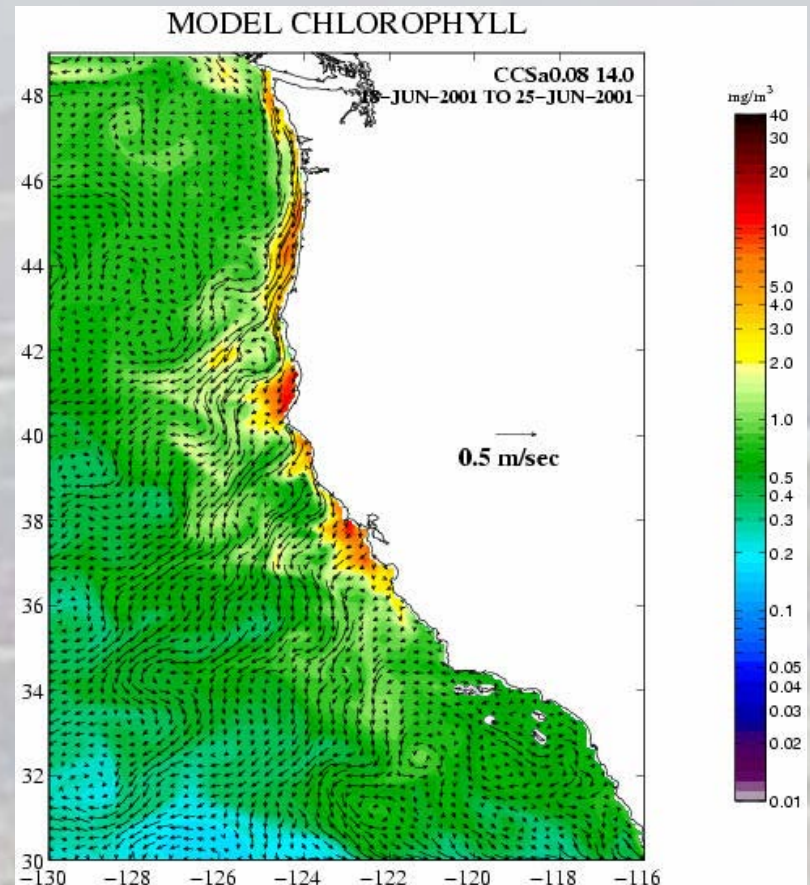
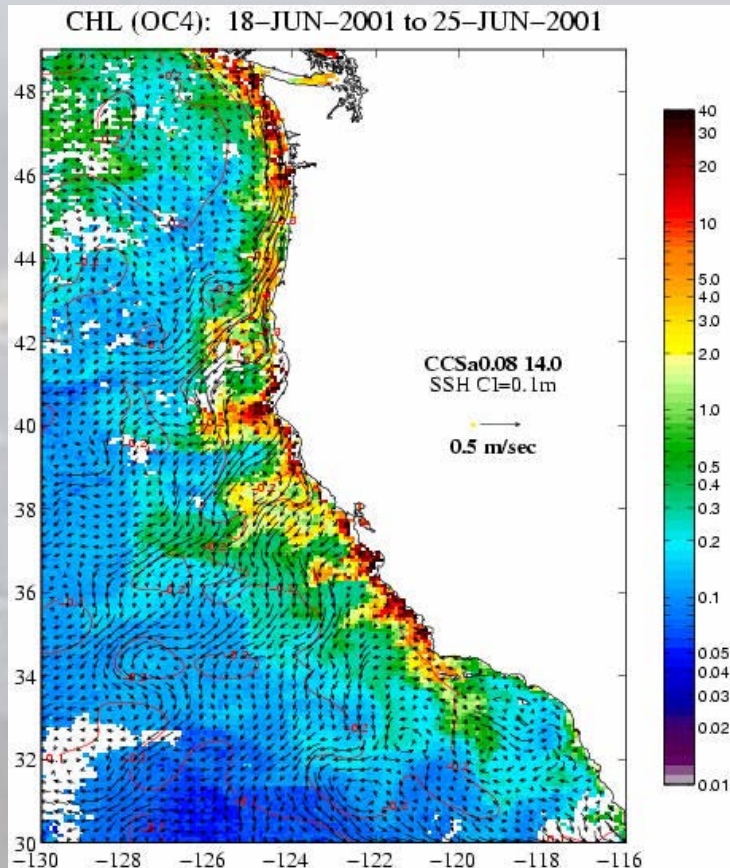
- COAMPS Forcing
 - Force with High resolution Regional fluxes
- Forcing with Prescribed Fluxes
 - Force with “ Total Heat Flux”
- Boundary/ Initial Values for Tracers
 - Provide IC/BC for tracers
 - Regrid Tracer Climatology to HYCOM grid: Regridded to Reference Density Grid
 - Scripts to generate Input files for tracers: Buggy
 - Passive Tracer flag, “ TRCFLG=0” relaxed to climatological surface field.
- Must use Release 34 or greater

HYCOM Model Simulations vs. SeaWIFS

Chlorophyll

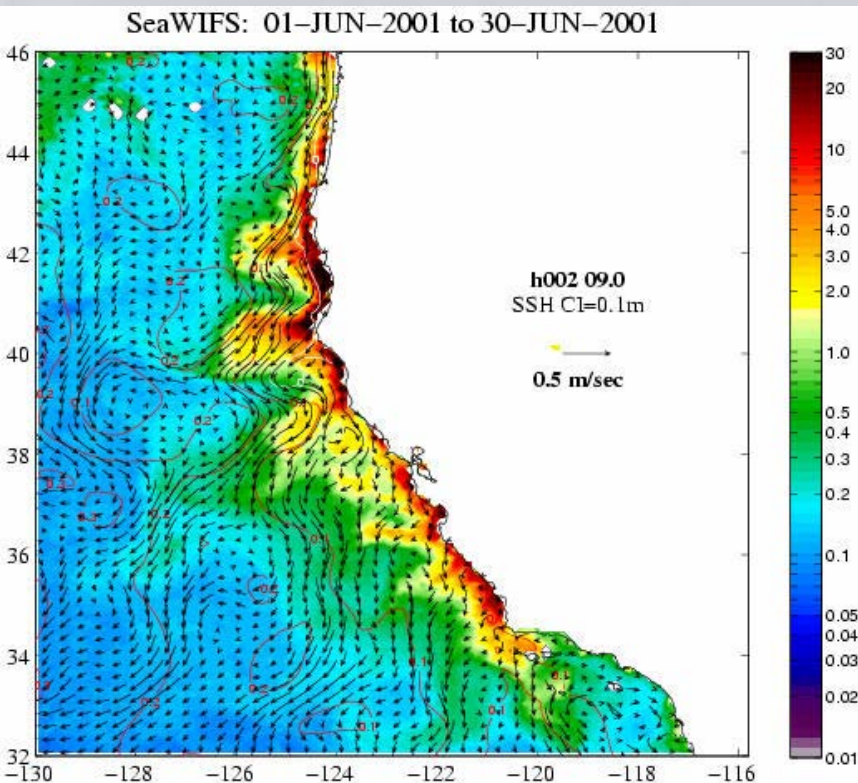
NRL West Coast HYCOM with
SeaWIFS Chlorophyll

NRL West Coast HYCOM with
Model Chlorophyll

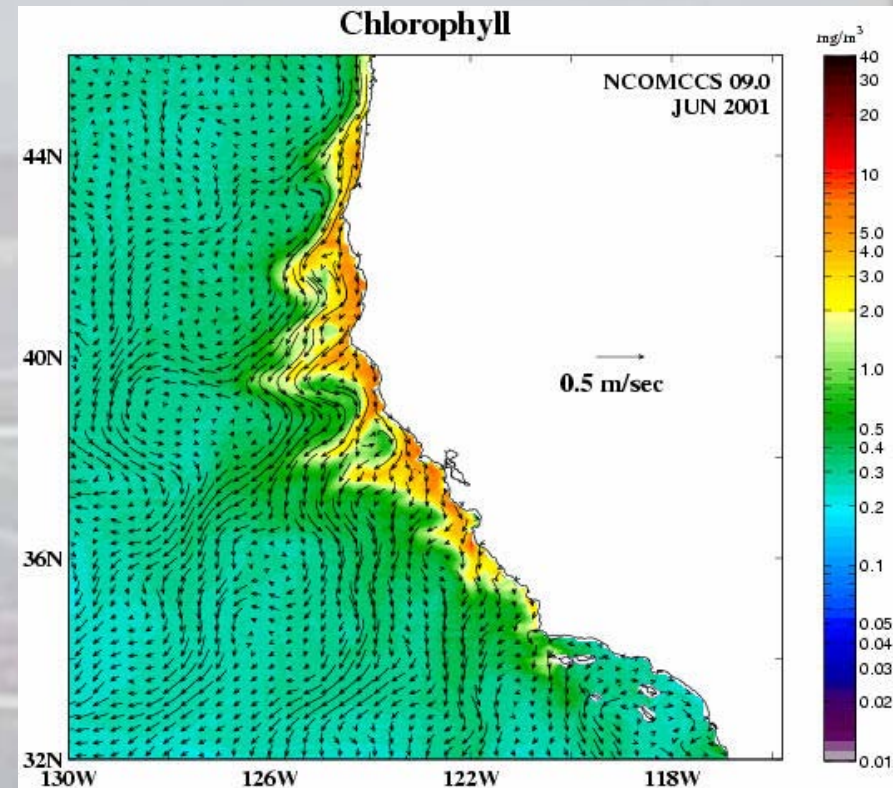


NCOM Results

NRL West Coast NCOM with
SeaWIFS Chlorophyll

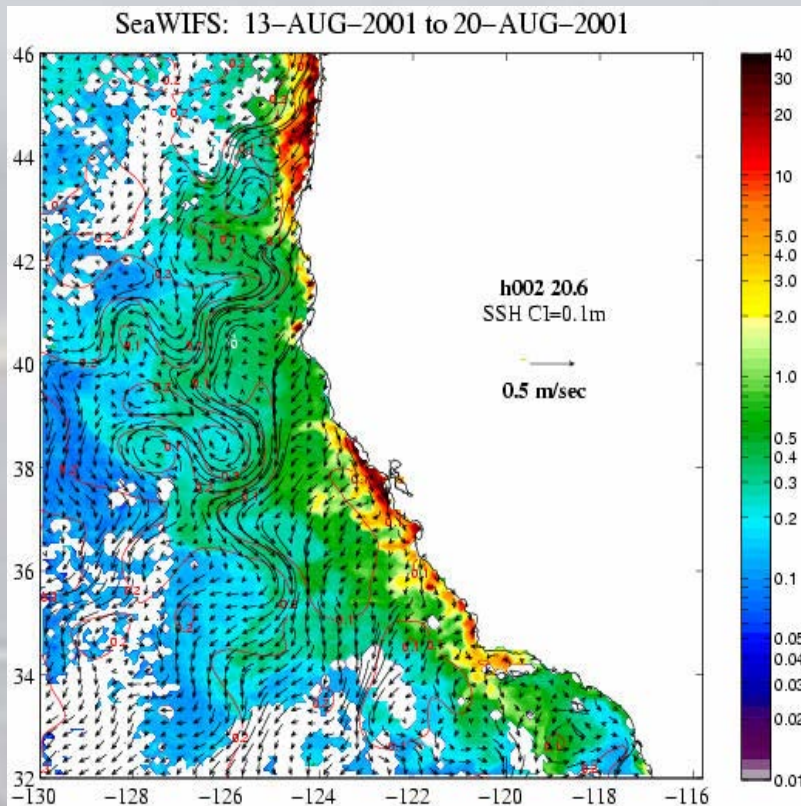


NRL West Coast NCOM with
Model Chlorophyll

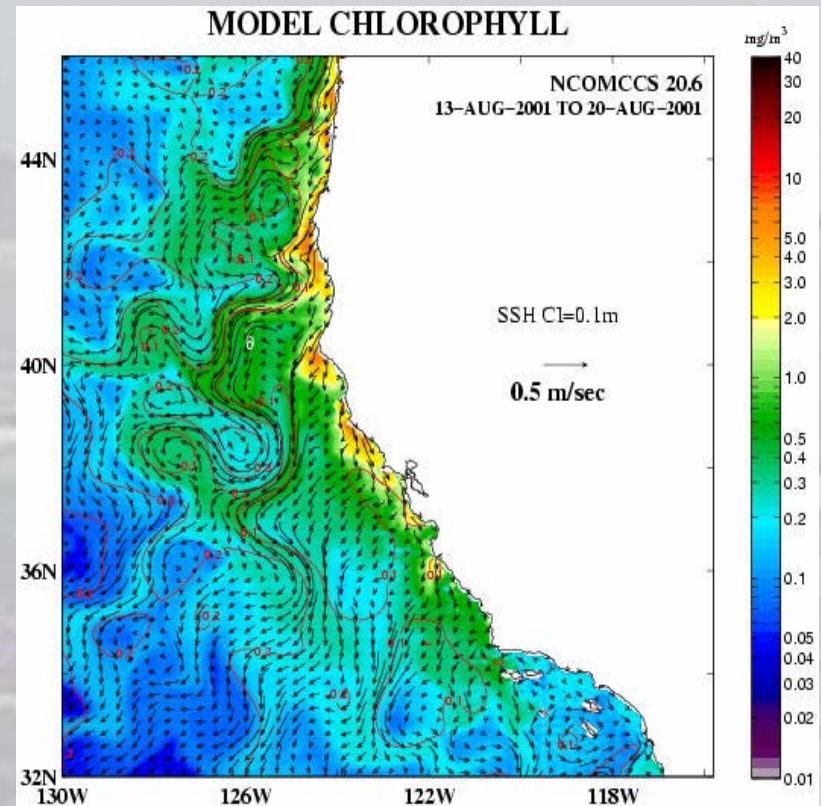


Model Simulations vs. SeaWIFS

NRL West Coast NCOM with
SeaWIFS Chlorophyll



NRL West Coast NCOM with
Model Chlorophyll



PLANS

- Non-Assimilative Runs
 - Complete Development
 - Parameter studies/ comparisons with NCOM
- Nest to Monterey Bay Sub-domain
 - Curvilinear Coord. Implementation
 - Force with Archive files for Tracers
- Data Assimilative runs
 - Data Assimilation for Pacific & Regional HYCOM
- Real-time implementation
 - HYCOM CCS & Monterey Bay Domains
- Sensitivity of Coupled Model to Vertical Coordinate,..